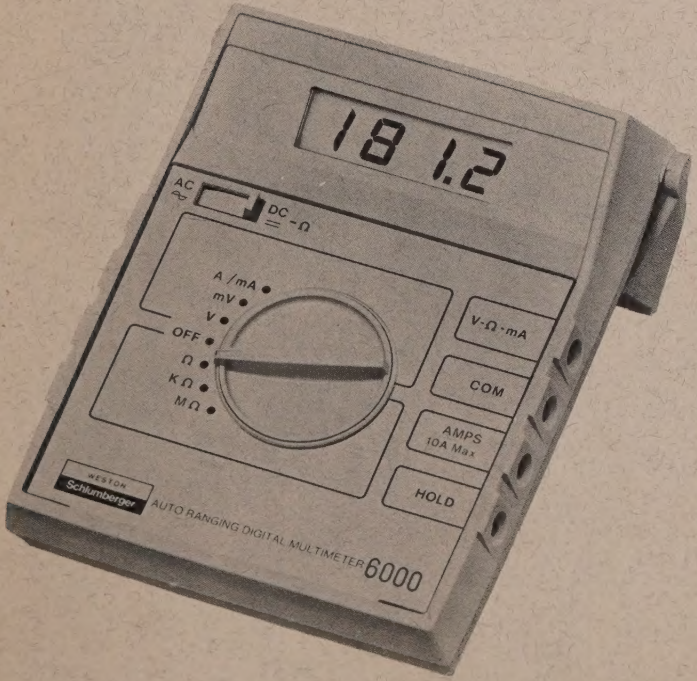
WESTON®

MODEL 6000



Autoranging
DIGITAL MULTIMETER

OPERATING INSTRUCTIONS

SAFETY NOTICE

WESTON EXERTS EVERY EFFORT TO INSURE THAT THIS INSTRUMENT WILL PROVIDE SAFE, DEPENDABLE SERVICE. PERSONNEL USING THE INSTRUMENT ARE URGED TO ACQUAINT THEMSELVES WITH THE OPERATING INSTRUCTIONS BEFORE USING. OPERATING AND MAINTENANCE PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS WHEN MAKING MEASUREMENTS ON ELECTRICAL CIRCUITS.

AVOID CONTACT WITH ANY EXPOSED ENERGIZED ELECTRICAL CIRCUITS.

UNDER CERTAIN CONDITIONS, DANGEROUS POTENTIALS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE OFF POSITION DUE TO CHARGES RETAINED BY CAPACITORS. TO AVOID HAZARDS, ALWAYS REMOVE POWER AND DISCHARGE AND GROUND CIRCUITS BY USE OF A GROUNDING STICK PRIOR TO TOUCHING THEM.

WHEN MAKING HIGH VOLTAGE MEASUREMENTS, DO NOT TOUCH THE TEST LEADS OR THE INSTRUMENT. BEFORE MAKING CONNECTIONS TO OR CHANGING THE POLARITY OF HIGH VOLTAGE CIRCUITS, ALWAYS FIRST DE-ENERGIZE THE CIRCUIT.

DANGEROUS ARCS OF EXPLOSIVE NATURE CAN OCCUR IF THE CIRCUIT IS SHORTED IN HIGH POWER CIRCUIT AREAS SUCH AS DISTRIBUTION TRANSFORMERS. ALWAYS SET THE FUNCTION SWITCH OF THE INSTRUMENT TO THE CORRECT POSITION BEFORE TAKING MEASUREMENTS. WHEN TAKING VOLTAGE MEASUREMENTS, NEVER SET FUNCTION SWITCH TO THE CURRENT OR LOW RESISTANCE POSITION. (SEE OPERATION SECTION)

INSERT BANANA PLUGS OF TEST LEADS FULLY INTO THE JACKS SO NO BARE METAL IS EXPOSED. (SEE OPERATION SECTION)

MAKE ADJUSTMENTS WITH AN INSULATED TOOL (JFD PART NO. 5284 OR EQUIVALENT). (SEE MAINTENANCE SECTION)

OBSERVE INPUT LIMITS. (SEE OPERATION SECTION)

REMOVE TEST LEADS AND SET THE FUNCTION SWITCH TO "OFF" POSITION TO REPLACE FUSE AND BATTERIES. (SEE MAINTENANCE SECTION)

OPERATING INSTRUCTIONS

for

DIGITAL MULTIMETER

WESTON MODEL 6000

U.S. Patent 3,051,939
and Other Patents Pending

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WESTON
Schlumberger

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PREPARATION FOR USE

General

Inspect the instrument for possible damage in shipment. If damage is noted, notify the carrier and supplier before using the instrument.

Batteries

The batteries are packed separately and are easily installed in the following manner.

WARNING

DO NOT INSERT TEST LEADS IN JACKS WHEN INSTALLING BATTERIES

1. Place FUNCTION switch in MΩ position.
2. Remove snap on front plastic range plate by hooking a non-metallic object such as your thumbnail under the plate at the AC-DC slide switch opening. Pull plate up and away from the instrument until range plate snaps off. Note that ledge in case secures bottom of range plate.
3. Set FUNCTION switch in OFF position.
4. Install new batteries. Be certain connector is pressed firmly into place and wire leads are not pinched when range plate is installed.
5. To install range plate, slide plate into lower ledge in case, then press down firmly with both thumbs, while encircling the lip around the FUNCTION switch.
6. The instrument is ready for use. Refer to OPERATION section for detailed procedure.
7. The liquid crystal display should not be exposed to temperature in excess of 55°C.

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GENERAL DESCRIPTION

The Weston Model 6000 is a bi-polar 3½ digit portable self-contained digital multimeter (DMM) designed for laboratory and field use. It is lightweight, shock resistant and is designed for convenience, utility and ruggedness.

Five AC and DC voltage ranges, five AC and DC current ranges and six resistance ranges are self-contained in a polycarbonate plastic case. The 26 ranges are accomplished by use of autorange on volts, milliamperes, amperes, kilohms and megohms functions. 200.0 mV and 200.0 ohms ranges are selected by separate positions on the function switch. AC and DC measurements are selected with a slide switch.

The Model 6000 uses a reflective, field effect liquid crystal display providing excellent readability over a wide range of ambient light levels. The display numeral height is 0.5 inch.

A single pair of banana jacks handle all input functions except amperes. Ampere ranges are provided through a separate jack. Two disposable 9 volt zinc carbon batteries provide a minimum of 200 hours of continuous operation. (See Maintenance Section). All components are mounted on a single printed circuit board. Custom LSI circuitry contributes to reduced component count, and enhanced reliability.

A remote-hold input jack permits storing the result of a measurement as long as the remote-hold input is connected to common.

SPECIFICATIONS

SPECIFICATION[1]	D.C. VOLTAGE	A.C. VOLTAGE	D.C. CURRENT	A.C. CURRENT	RESISTANCE
Accuracy	0.35% Rdg ± 2d	0.5% Rdg ± 5d[2]	0.75% Rdg ± 3d	1.5% Rdg ± 5d[3]	0.5% Rdg ± 1d[4]
Input Impedance	10 Megohms	9 Megohms/ 39 pF	10 ohms[5]	10 ohms[5]	----
Resolution	100 uV	100 uV	1 uA	1 uA	0.1 ohm
Maximum Reading	1000 V	1000 V	10 A	10 A	20 Megohm
Overload Rating	1500 V peak	1000 V (1500V peak)	1/4A 250V fuse[5]	1/4A 250V fuse[5]	250V (350V peak)
Temperature Coefficient[6]	250 ppm/°C[7]	600 ppm/°C	300 ppm/°C	750 ppm/°C	600 ppm/°C[4]

NOTES:
1. Specifications guaranteed for 90 days and when operated at 23°C ± 5°C
2. 40 to 400 Hz; ±(2% Rdg ± 5d) for 1000 VAC range
3. 40 to 400 Hz
4. ± 1% Rdg ± 2d and 2000 ppm/°C for 200 ohm range
5. Except 0 to 2A/10A ranges: 0.01 ohm input, 15A max.
6. Offset temco 1d/5°C beyond the 23°C ± 5°C range.
7. Temco for 1000 V range is 350 ppm/°C max.

Polarity	Automatic bipolar
NMRR (DC only)	66dB at 50 Hz (20 dB near zero)
Display	1999 with polarity (0.5"/12.7 mm LCD)
Display Hold	SPST contact closure (HOLD to COM) retains reading
Operating Power	Two 9V "transistor" batteries (NEDA 1604, PP3 or RR3)
Battery Life	200 operating hours; extended life with premium batteries
Low Battery Warning	Valid reading blinks during final 10 hours
Outrange Indication	Blinking "1888" display ("1" and "888" alternate) together with all decimal points.
Operating Ambient	5° to 50°C, 10 to 85% R.H.
Storage Temperature	-10 to +55°C
A.C. Frequency Influence:	
0-2/20/200 V	Less than 0.25 dB to 16 kHz
0-200 mV, 0-1000 V and current	Less than 0.5 dB to 1000 Hz
Weight	22 oz. (625 g) incl. batteries
Size	7" x 5.75" x 2.25" (178 x 146 x 58 mm) overall

OPERATION

Panel Description (Refer to Figure 1)

1. Display: 3½ digit ½ inch liquid crystal display.
2. Slide Switch: A two position slide switch. The left position is for measuring AC signals. The right position is for measuring DC signals and resistance.
3. Function Switch: 7 position mode switch for the functions indicated. Stops are built into the switching mechanism.

CAUTION

DO NOT ATTEMPT TO ROTATE THE FUNCTION SWITCH BEYOND THE LIMITS

4. Input Jacks: Input "V-Ω-mA" jack and "COM" jack are used for all measurements excluding AC and DC amperes.
   Input "HOLD" jack and "COM" jack may be connected together to permit storage of a measurement.

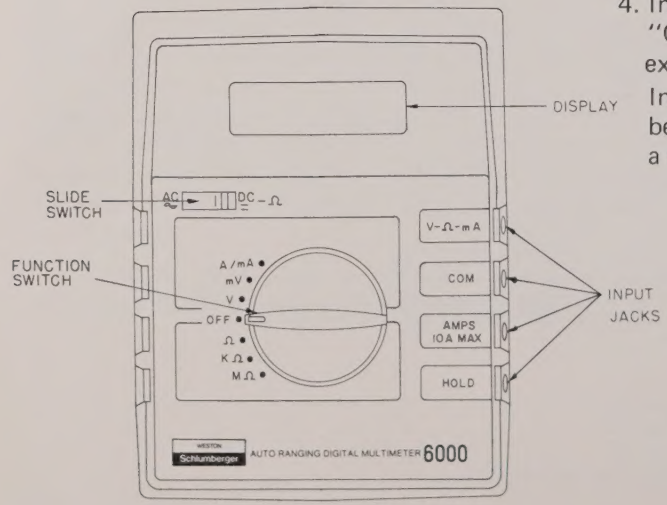


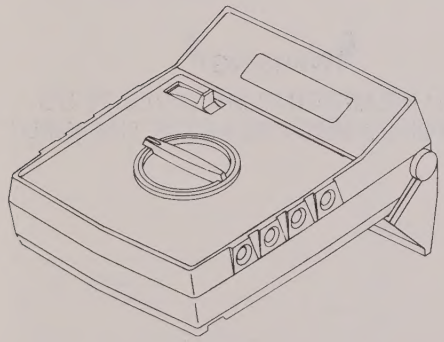
Figure 1. Front Panel

HIGH VOLTAGE PRECAUTION

IT IS IMPORTANT TO INSERT THE MALE BANANA PLUG FULLY INTO THE INPUT JACK SO THAT NO BARE METAL IS EXPOSED

Carrying Handle

The handle serves as a tilt stand and window protector as shown in figure 2.



HANDLE IN TILT
STAND POSITION

HANDLE IN WINDOW
PROTECTOR POSITION

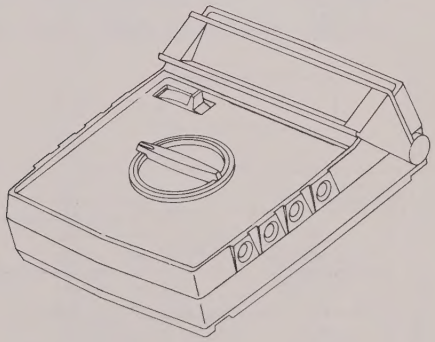


Figure 2. Handle Positions

AC or DC Millivolts Measurements

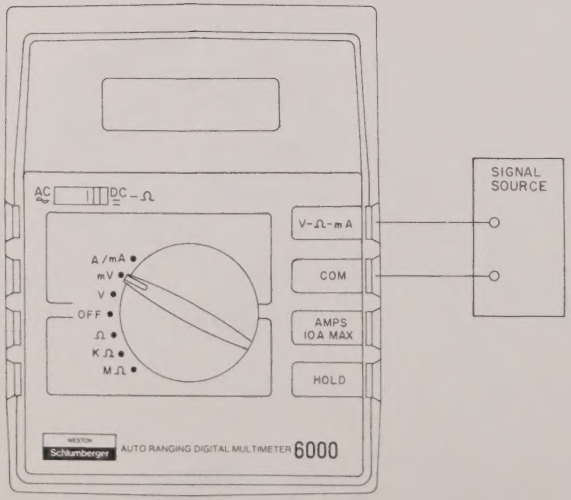
(Refer to Figure 3)

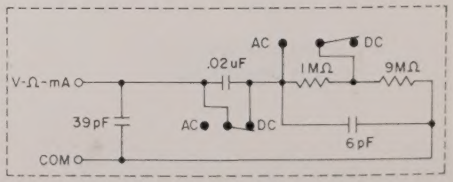
9 to 199.9 mV

1. Select AC or DC on AC-DC slide switch.
2. Rotate FUNCTION switch to mV position.
3. Connect test leads to jacks marked "V-Ω-mA" and "COM".
4. Full scale millivolts equal 199.9mV.

WARNING

WHEN MEASURING MILLIVOLTS DO NOT EXCEED 1500V PEAK ON THE INPUT





DMM EQUIVALENT CIRCUIT

Figure 3. AC or DC Millivolts Measurements

AC or DC Volts Measurements

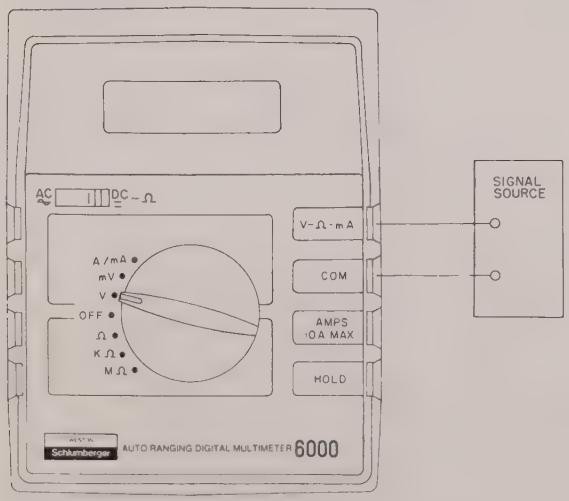
(Refer to Figure 4)

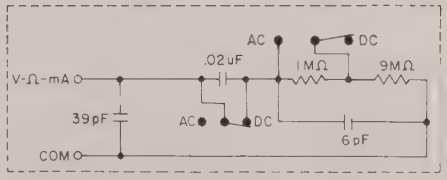
1.999 to 1000 volts

1. Select AC or DC on AC-DC slide switch.
2. Rotate FUNCTION switch to V position.
3. Connect test leads to jacks marked "V-Ω-mA" and "COM"
4. Full scale voltage equals 1000 volts. Autoranging occurs automatically over ranges from 1.999 volts to 1000 volts.
5. Autoranging: Range UP occurs when display exceeds 1999 counts. Range DOWN occurs when display reads less than 180 counts.

WARNING

WHEN MEASURING VOLTS DO NOT EXCEED 1500V PEAK ON INPUT





DMM EQUIVALENT CIRCUIT

Figure 4. AC or DC Voltage Measurements

AC or DC Current Measurements

(Refer to Figure 5)

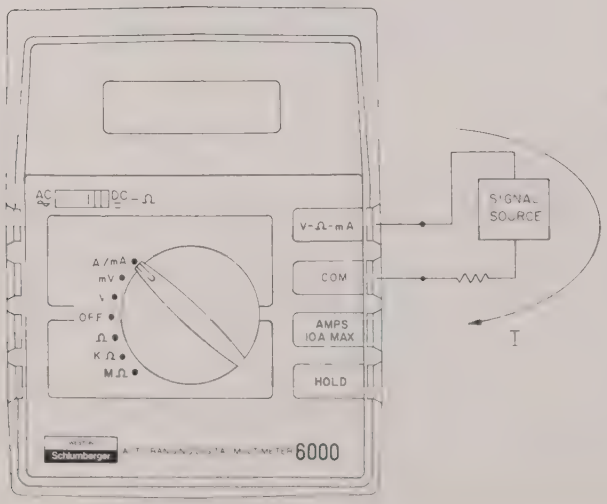
0 to 199.9 mA

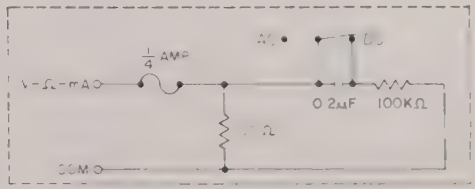
1. Select AC or DC on AC-DC slide switch.
2. Rotate FUNCTION switch to mA position.
3. Connect test leads to jacks marked "V-Ω-mA" and "COM".
4. Full scale current equals 199.9 mA. Autoranging occurs automatically over ranges from 1.999 to 199.9 mA.

Full Scale Current	Full Scale Voltage Drop
1.999mA	20mV
19.99mA	200mV
199.9mA	2V

WARNING

WHEN MEASURING MILLIAMPERES DO NOT EXCEED 350V PEAK ON INPUT





DMM EQUIVALENT CIRCUIT

Figure 5. AC or DC Milliamperes Measurements

AC or DC Current Measurements

(Refer to Figure 6)

0 to 10 AMPS

1. Select AC or DC on AC-DC slide switch.
2. Rotate FUNCTION switch to A position.
3. Connect test leads to jacks marked "AMPS" and "COM".
4. Full scale current equals 10 ampere. Autoranging occurs automatically over 1.999 to 19.99 amperes.

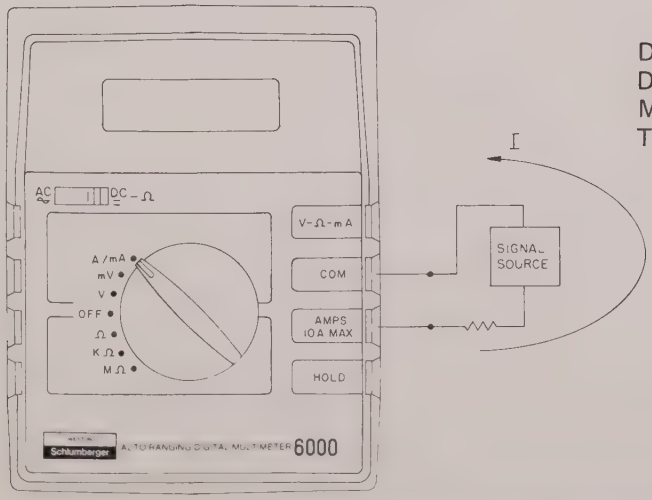
NOTE: Combined current must not exceed 10 amperes continuous or 15 amperes intermittently for maximum period of 15 seconds.

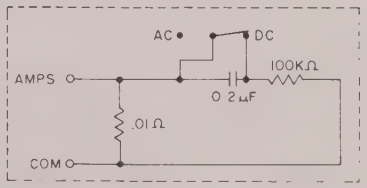
Full Scale Current	Full Scale Voltage Drop*
1.999A	20mV
19.99A	200mV

*Does not include test lead voltage drop.

WARNING

DO NOT EXCEED 350V PEAK ON INPUT.
DO NOT INTERRUPT CIRCUIT WHILE MEASUREMENT IS IN PROGRESS.
THE AMPERE SHUNT IS NOT FUSED.





DMM EQUIVALENT CIRCUIT

Figure 6. AC or DC Ampere Measurements

DC Resistance Measurements

(Refer to Figure 7)

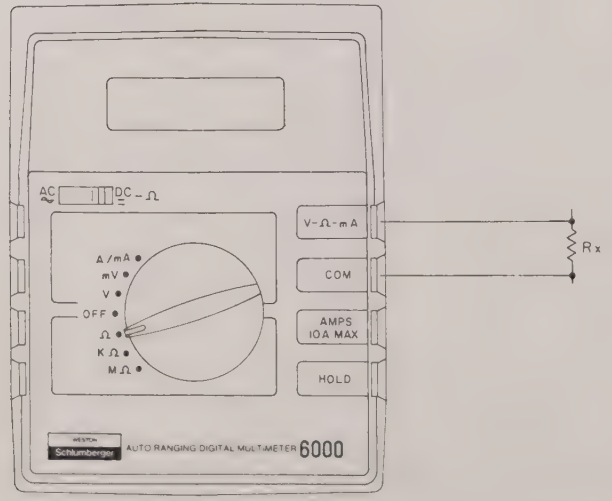
0 to 199.9 Ohms

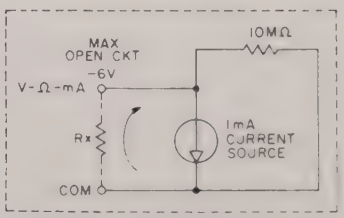
1. Set AC-DC slide switch to DC.
2. Rotate FUNCTION switch to Ω position.
3. Connect test leads to jacks marked "V-Ω-mA" and "COM".
4. Full scale resistance equals 199.9 ohms.

NOTE: It may be necessary to subtract a residual count of 0.1 to 0.2 ohms due to contact and test lead resistances from all readings for maximum accuracy.

WARNING

REMOVE POWER FROM CIRCUIT UNDER TEST. DO NOT EXCEED 350V PEAK ON INPUT.





DMM EQUIVALENT CIRCUIT

Figure 7. Resistance Measurements

DC Resistance Measurements

(Refer to Figure 8)

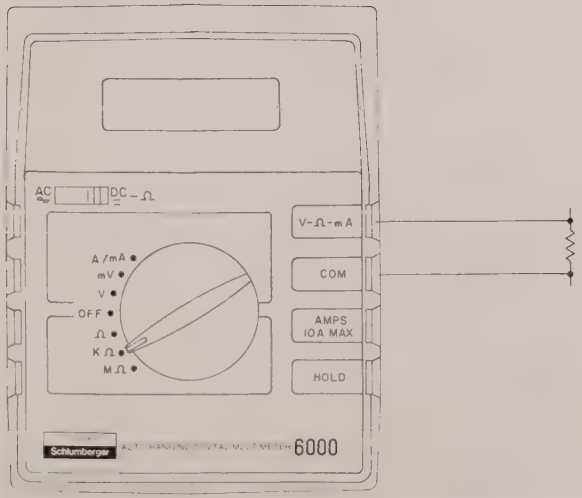
0 to 19.99 Megohms

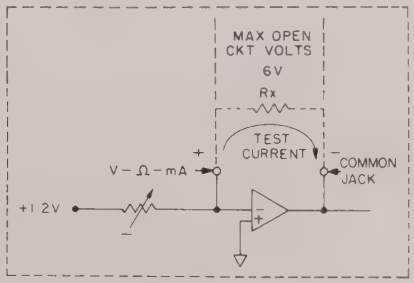
1. Set AC-DC slide switch to DC.
2. Rotate FUNCTION switch to KΩ or MΩ position.
3. Connect test leads to jacks marked "V-Ω-mA" and "COM".
4. Full scale resistance equals 19.99 megohms. FUNCTION switch at KΩ provides autoranging from a full scale of 1.999KΩ to 199.9KΩ. FUNCTION switch at MΩ provides autoranging from a full scale of 1.999MΩ to 19.99MΩ.

RANGE	TEST CURRENT
1.999KΩ	1.2mA
19.99KΩ	0.12mA
199.9KΩ	0.012mA
1.999MΩ	1.2uA
19.99MΩ	0.12uA

WARNING

REMOVE POWER FROM CIRCUIT UNDER TEST. DO NOT EXCEED 350V PEAK ON INPUT.





DMM EQUIVALENT CIRCUIT

Figure 8. Resistance Measurements

Low Battery Indication

When one or both batteries require replacement, the Model 6000 continues to operate, but the display blinks. Accuracy is maintained for 10 to 20 hours of operation after the blinking warning appears.

Overrange Indication

An overrange result turns on all three decimal points, and the thousands "1" and "888" blink out of phase with each other.

Remote Hold

An external connection from the remote hold jack to the common jack holds the most recent measurement and prevents further readings until connection is broken.

If the remote hold is applied before the reading stabilizes, one of two indications will result. Ranging towards less sensitivity: all decimal points turn on. Ranging towards greater sensitivity: the energized decimal point blinks.

MAINTENANCE

Operating Maintenance

In the course of normal operation, the instrument should require no maintenance other than the occasional replacement of batteries and the overload protection fuse. The case should not be opened except by a factory authorized representative.

WARNING

REMOVE TEST LEADS AND SET FUNCTION SWITCH TO OFF POSITION WHEN REMOVING BATTERIES AND FUSE

Battery and Fuse Replacement

(Refer to Figure 9)

1. Remove test leads from instrument.
2. Place FUNCTION switch in MΩ position.
3. Remove snap on front plastic range plate by hooking a non-metallic object such as your thumbnail under the plate at the AC-DC slide switch opening. Pull plate up and away from the instrument until range plate snaps off. Note that ledge in lower case secures bottom of range plate.

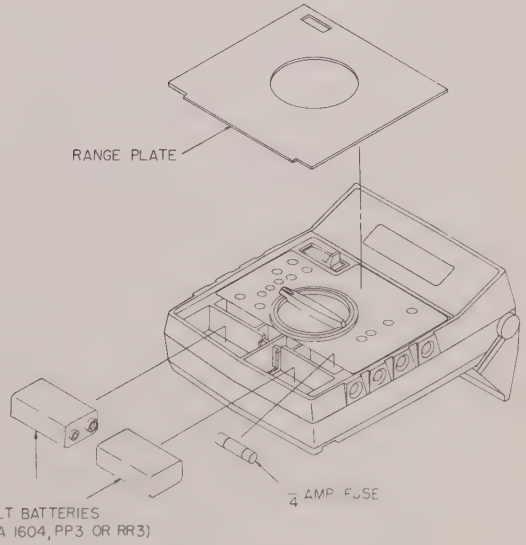
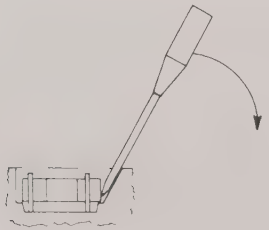


Figure 9. Battery and Fuse Replacement Diagram

4. Set FUNCTION switch in OFF POSITION.
5. Two 9 volt batteries and a ¼ amp fuse are located in the cavities of the case.
6. Remove batteries and snap off connector.
7. Install new batteries in pairs. Be certain connector is pressed firmly into place and wire leads are not pinched when range plate is installed.
8. Snap out fuse with a tool as shown in Figure 10. Install a new fuse.
9. To install range plate, slide plate into lower ledge in case, then press down firmly with both thumbs, while encircling the lip around the FUNCTION switch.



Cleaning

Clean window and case with absorbent lint-free cotton cloth dipped in a solution made by dissolving one-half teaspoon of mild dish detergent in one gallon of water. Lightly wipe over and allow solution to air dry.

CAUTION

DO NOT USE ANY CHEMICAL SOLVENTS TO CLEAN WINDOW OR CASE

Typical Battery Current Drain

	+Battery	−Battery
Current	1.8mA	1.2mA
Volts	1.5mA	1.2mA
Ohms	1.6mA	2.2mA
KΩ	3.5mA	2.4mA
MΩ	2.2mA	1.8mA

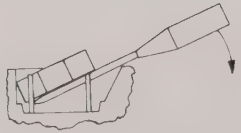


Figure 10. Fuse Removal

ADJUSTMENTS

General

This instrument has been calibrated at the factory. However, if adjustment is required, all controls are accessible without uncasing.

Conduct operations at an ambient temperature of 23°C±3°C. Minimum calibration equip- required is as follows:

DC voltage source capable of 0 to 1000 volts ± 0.05%.

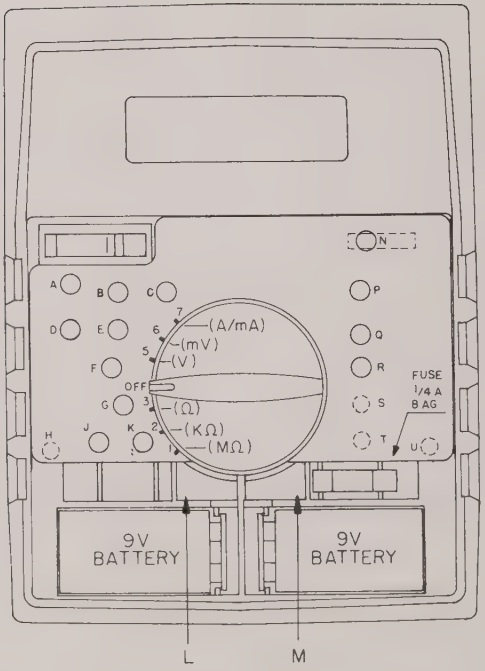
Resistance Decade Box, range 0 to 1 Megaohms ± 0.05%.

Procedure

1. Remove range plate as detailed in the Maintenance Section.
2. Figure 11 shows the locations of the trimmer controls.
3. Refer to Adjustment Table for information and procedure for alignment of Trim Controls.
4. Set AC-DC Slide Switch to DC position.
5. Energize instrument.
6. Apply calibration source input to "V-Ω-mA" jack and "COM" jack for adjustments.

WARNING

USE INSULATED ALIGNMENT TOOL WHEN ADJUSTING TRIMMER CONTROLS.



NOTES: Trimmer Controls H,S,T and U not used in this model. Trimmer Controls L and M are recessed in case opening as shown.

Figure 11. Trim Adjustments

ADJUSTMENT TABLE

STEP	SWITCH SETTING	TEST SIGNAL	TRIMMER CONTROL	INSTRUCTIONS	FINAL DISPLAY READING
1	V	-0.010V	A	Adjust for reading:	-.010±0
2	V	+0.010V	B	Adjust for reading:	.010±0
3	KΩ	0Ω	P	Preset fully clockwise (leave at CW limit until step 10)	——
4	KΩ	0Ω	L	Preset fully clockwise, then adjust CCW for reading:	.003±2
5	V	±0.010V	A,B	Recheck settings of steps 1 & 2	±.010±0
6	V	±1.700V	E	While reversing input signal polarity, adjust control E for identical positive and negative readings (absolute reading unimportant)	——
7	V	+1.700V	Q	Adjust for reading:	1.700±0
8	V	±1.700V		Repeat steps 6 & 7	
9	V	+1000V	F	Adjust for reading:	999±1
10	KΩ	10Ω	P	Adjust for reading:	.010±0
11	KΩ	170KΩ	C	Adjust for reading:	170.0±4
12	KΩ	1.7KΩ	R	Adjust for reading:	1.700±4
13	Ω	170Ω	M	Adjust for reading:	170.0±4

REPLACEMENT PARTS LIST

ITEM	DESCRIPTION	PART NUMBER
1	RANGE PLATE	277874-901
2	BATTERY, TRANSISTOR, 9 volt, NEDA 1604 (No. 216, PP3, RR3 or equivalent)	276304-001
3	FUSE, 1/4 AMP, 250 volts (8AG or 5mm x 20mm)	ND29787-001
4	DECAL, INSTRUCTIONS	277866-901
5	TEST LEADS (Red and Black)	277884-901

WESTON EQUIPMENT WARRANTY

Weston warrants equipment of its manufacture against defective materials or workmanship for a period of one year from date of shipment.

The liability of Seller under this warranty is limited, at Seller's option, solely to repair, replacement with equivalent Weston equipment, at an appropriate credit adjustment not to exceed the original equipment sales price, of equipment returned to the Seller provided that (a) Seller is promptly notified in writing by Buyer upon discovery of defects, (b) Upon receipt of written authorization from Seller the defective equipment is returned as directed, transportation charges prepaid by Buyer, and (c) Seller's examination of such equipment discloses to his satisfaction that defects were not caused by negligence, misuse, improper installation, accident, or unauthorized repair or alteration by the Buyer.

This warranty does not include mechanical parts failing from normal usage nor does it cover limited life electrical components which deteriorate with age such as batteries, etc.

This warranty is in lieu of all other warranties, expressed or implied, including the implied warranty of fitness for a particular purpose to the original purchaser or to any other person. Seller shall not be liable for consequential damages of any kind.

The aformentioned provisions do not extend the original warranty period of any article which has been either repaired or replaced by Seller.

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